

## CLAIMS

1. A semiconductor device characterized by comprising:

- a silicon substrate;
- an antenna made of gold;
- an insulating layer; and
- an integrated circuit formed on a surface of said silicon substrate for processing information to be transmitted/received from said antenna,

wherein said antenna, insulating layer and integrated circuit are laminated in this order on the surface of said silicon substrate, a thickness of said semiconductor substrate is set to 200  $\mu\text{m}$  or thinner, and a width and a thickness of said antenna are set to 2.6  $\mu\text{m}$  or larger and 10  $\mu\text{m}$  or smaller.

2. A semiconductor device characterized by comprising:

- an antenna made of gold;
- an insulating layer; and
- an integrated circuit formed on a surface of a silicon substrate for processing information to be transmitted/received from said antenna,

wherein said antenna, insulating layer and integrated circuit are laminated in this order, a thickness of said semiconductor substrate is a thickness of said integrated circuit or is set thinner than 50  $\mu\text{m}$ .

3. The semiconductor apparatus according to

claim 1 or 2, wherein electrode portions for connecting said antenna and said integrated circuit are formed in areas where said resin layer is formed in a tapered shape.

4. The semiconductor apparatus according to any one of claims 1 to 3, wherein said antenna has a thickness and a width not presenting a skin depth effect by electronic magnetic waves used by communications, and the width is narrower than 10  $\mu\text{m}$ .

5. The semiconductor apparatus according to any one of claims 1 to 4, further comprising a tape coated with an adhesive layer, and a side of said antenna of said semiconductor device is adhered to said adhesive layer.

6. The semiconductor apparatus according to claim 3, wherein a radiation antenna is connected in place of said antenna.

7. A paper sheet characterized by comprising:  
the semiconductor device recited in any one of claims 1 to 5; and  
a protective member having a recess,  
wherein the semiconductor device is threaded being included in said recess of said protective member.

8. A staple of a stapler characterized in that the semiconductor device received in any one of claims 1 to 5 and claim 7 is mounted on a surface or inside the staple of the stapler.

9. A manufacture method for the semiconductor device according to claims 1 to 4, characterized by comprising a step of:

etching a wafer from a rear surface thereof to an oxide film inside the wafer to form separation grooves.